

Notice No. 5

Rules and Regulations for the Classification of Ships, July 2014

The status of this Rule set is amended as shown and is now to be read in conjunction with this and prior Notices. Any corrigenda included in the Notice are effective immediately.

Issue date: November 2014

Amendments to	Effective date
Part 1, Chapter 2, Section 2	1 December 2014
Part 3, Chapter 14, Section 1	1 December 2014
Part 3, Chapter 16, Sections 1-11	1 December 2014
Part 4, Chapter 8, Sections 1, 3 & 13	1 December 2014
Part 4, Chapter 8, Section 14	CORRIGENDA
Part 4, Chapter 8, Section 14	1 December 2014



Lloyd's
Register

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Part 1, Chapter 2

Part 1, Chapter 2 Classification Regulations

Effective Date 1 December 2014

■ Section 2 Character of classification and class notations

2.1 Definitions

2.1.8 — ShipRight notation. A notation indicating that one or more of LR's **ShipRight** procedures have been satisfactorily followed. Class notations or descriptive notes will be assigned according to whether the **ShipRight** procedures are applied on a mandatory or voluntary basis, i.e.:

- (a) The procedures relating to the design and construction of the hull are mandatory for the classification of large and structurally complex ships. In such cases, the associated **ShipRight** notation is assigned as a class notation and will appear in column 4 of the *Register Book*, see 2.3.17. When these procedures are applied on a voluntary basis, then the associated **ShipRight** notation is assigned as a descriptive note and will appear in column 6 of the *Register Book*, see 2.7.
- (b) The remaining **ShipRight** procedures are voluntary for the purposes of classification, and are assigned as descriptive notes and will appear in column 6 of the *Register Book*, see 2.8.3.

2.1.8 ShipRight notation. Where one or more of LR's **ShipRight** notation procedures have been satisfactorily applied, then a notation showing the associated characters of the procedure(s) within brackets will, at the Owner's request, be entered in column 4 of the *Register Book*, preceded by the word **ShipRight**, see 2.3.17. Other **ShipRight** procedures that have been satisfactorily applied will similarly be shown as descriptive notes and will appear in column 6 of the *Register Book*, see 2.8.3.

(Part only shown)

Table 2.2.2 Special features notations

Special features notation	Description	See also
DSPM4	Dual Single Point Mooring. Assigned to a ship provided with a dual mooring line arrangement at a single-point mooring	Pt 3, Ch 13,8
ECL(1, 2, 3)	Assigned to vessels where work spaces, movement about the ship, fall protection and working arrangements on deck have been specially considered for performing container securing, inspection and other related tasks.	Provisional Rules and Regulations for Ergonomic Container Lashing

2.3 Class notations (hull)

2.3.17 ShipRight() notations. The following notations are associated with LR's **ShipRight** procedures and may be assigned in conjunction with the **ShipRight** notation as considered appropriate by the Classification Committee, on application from the Owners. Where one or more of LR's **ShipRight** procedures for the following have been satisfactorily applied, then a notation showing the associated

characters of the procedure(s) within brackets will, at the Owner's request, be entered in column 4 of the *Register Book*, preceded by the word **ShipRight**, e.g. **ShipRight(CM, SDA, FDA plus(25,NA))**. The requirements pertaining to these notations and the **ShipRight** procedures are given in Pt 3, Ch 16.

ShipRight ACS 0 The **ShipRight Anti-Corrosion System notation** This **ShipRight** notation (Anti-Corrosion System) will be assigned when a specified area or areas of the ship have been protected against corrosion

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in accordance with the relevant ShipRight procedures. The **ShipRight ACS()** notation with the extension of one or more of the following associated supplementary characters shown in brackets, detailing the specified protected area or areas, may be assigned;

- B** for protective coating system of water ballast tanks;
- D** for protective coating system of double-side skin spaces;
- C** for protective coating system of cargo oil tanks;
- C*** when corrosion resistant steel has been used in cargo oil tanks;
- V** for protective coating system of void spaces.

CM This ShipRight notation (Construction Monitoring), which complements the ShipRight **SDA**, **FDA**, **FDA plus()**, **FDA ICE**, **FDA SPR**, and **WDA** notations, will be assigned when the controls in construction tolerances detailed in the relevant ShipRight procedures have been applied and verified. The ShipRight notation **CM** is mandatory upon application of any of the following ShipRight notations: **SDA**, **FDA**, **FDA plus()**, **FDA ICE**, **FDA SPR** and **WDA**.

ShipRight SDA This notation (Structural Design Assessment) will be assigned when direct calculations in accordance with the ShipRight procedures have been applied.

ShipRight FDA This ShipRight notation (Fatigue Design Assessment) will be assigned when an appraisal has been made of the fatigue performance of the hull structure in accordance with the relevant ShipRight **FDA** procedures.

ShipRight FDA plus() This ShipRight notation (Fatigue Design Assessment plus) may be assigned upon request when an appraisal has been made for a higher level of fatigue performance than that made for the assignment of **ShipRight FDA**. The appraisal may be made based upon a specific trading pattern, which is to be expressed in terms of either a Worldwide trading route, as defined in the **ShipRight FDA procedure** relevant ShipRight procedures, or a North Atlantic trading route (that utilises the wave data from IACS Recommendation 34). The ShipRight notation **ShipRight FDA plus()** is to be followed by the number of years that the vessel has been assessed for the specific trading pattern shown in brackets, for either the Worldwide or North Atlantic trading routes, denoted by **WW** and **NA** respectively, e.g., **ShipRight FDA plus (25, NA)**.

ShipRight FDA ICE This ShipRight notation (Fatigue Design Ice) will be assigned when an appraisal has been made for the fatigue performance of the ship hull structure when navigating in through ice in accordance with the relevant ShipRight procedures.

ShipRight CM This notation (Construction Monitoring), which complements the **ShipRight SDA**, **ShipRight FDA**, **ShipRight FDA plus** and **ShipRight FDA ICE** notations, will be assigned when the controls in construction tolerances detailed in the ShipRight procedures have been applied and verified.

FDA SPR This ShipRight notation (Springing Fatigue Assessment) will be assigned when an appraisal has been made of the fatigue performance of the hull structure taking into account the effects due to springing (the continuous vibrational response of the hull girder due to waves) in accordance with the relevant ShipRight procedures.

SDA This ShipRight notation (Structural Design Assessment) will be assigned when direct calculations in accordance with the relevant ShipRight procedures have been applied. The ShipRight notation **SDA** is mandatory upon application of any of the following ShipRight notations: **FDA**, **FDA plus()**, **FDA ICE**, **FDA SPR** and **WDA**.

WDA This ShipRight notation (Whipping Design Assessment) will be assigned when an appraisal has been made of the vibrational response of the hull structure due to wave impact loads (Whipping) in accordance with the relevant ShipRight procedures.

2.3.18 When **ShipRight SDA**, **ShipRight FDA**, **ShipRight FDA plus** or **ShipRight FDA ICE** the ShipRight notations **SDA**, **FDA**, **FDA plus()**, **FDA ICE**, **FDA SPR**, and **WDA** are assigned, the precise technical conditions of the appraisal will be made available to Owners.

2.3.19 Where LR's **ShipRight SDA** procedure has been applied individually or where **ShipRight SDA**, **ShipRight FDA** or **ShipRight FDA plus**, or **ShipRight FDA ICE** and **ShipRight CM** procedures have all been applied, whether on a voluntary or mandatory basis, these particular class notations will appear in column 4 of the Register Book.

Existing paragraphs 2.3.20 to 2.3.22 have been renumbered 2.3.19 to 2.3.21.

2.5 Class notations (machinery special features)

(Part only shown)

2.5.2 The following class notations are associated with positional mooring systems, or thruster-assisted positional mooring systems, and may be assigned as considered appropriate by the Classification Committee:

GF Assigned to ships other than LNG carriers, where the main propelling and/or auxiliary machinery is designed to operate on natural gas as fuel, or a combination of natural gas and oil fuel. The notation also indicates that the gas fuelled machinery has been installed and tested in accordance with LR's Rules and Regulations.

2.5.5 The following class notation is associated with gas-fuelled vessels and may be assigned as considered appropriate by the Classification Committee:

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GF <p>Assigned to ships other than LNG carriers, where the main propelling and/or auxiliary machinery is designed to operate on natural gas as fuel, or a combination of natural gas and oil fuel. The notation also indicates that the gas-fuelled machinery has been installed and tested in accordance with LR's Rules and Regulations.</p>	E <p>This ShipRight descriptive note (Evidence) will be assigned, where evidence exists that supporting calculations have been performed in accordance with hull structural finite element and fatigue analysis procedures of a recognised Classification Society. This descriptive note can be assigned to vessels transferring class or to new builds where the design has been appraised by another recognised classification society.</p>	
2.8 Descriptive notes		
<p>2.8.2 Where evidence exists that supporting calculations have been performed in accordance with hull structural finite element and fatigue analysis procedures of a recognised Classification Society, then, on application from Owners, the descriptive note ShipRight (E) may be entered in column 6 of the Register Book.</p> <p>2.8.3 2.8.2 Where LR's ShipRight procedures for the following have been applied on a voluntary basis, a descriptive note will, at the Owner's request, be entered in column 6 of the Register Book, preceded by the word ShipRight (see also <i>ShipRight Procedures Overview</i>, Pt 3, Ch 16 and Pt 5, Ch 21); ShipRight(). Where one or more of LR's ShipRight procedures for the following have been satisfactorily applied, then a descriptive note showing the associated characters of the procedure(s) within brackets will, at the Owner's request, be entered in column 6 of the Register Book, preceded by the word ShipRight, e.g. ShipRight(IHM, SERS). The requirements pertaining to these descriptive notes and the ShipRight procedures are given in Pt 3, Ch 16 and Pt 5, Ch 21.</p>	ES() <p>This ShipRight descriptive note (Enhanced Scantlings) will be assigned, where scantlings in excess of the approved Rule minimum are fitted at defined locations in accordance with the relevant ShipRight procedures. The added thickness measurement in mm is to be shown with a description of the location(s) in brackets e.g. ShipRight(ES(+1 Strength Deck, +2 Bottom Shell)).</p>	
BWMP()	<p>This ShipRight descriptive note (Ballast Water Management Plan) will be assigned, when the requirements in accordance with the relevant ShipRight procedures have been complied with. The descriptive note BWMP() with the extension of one or more of the following associated supplementary characters shown in brackets, detailing the method(s) used, may be assigned:</p> <ul style="list-style-type: none"> S sequential method; F flow through method; D dilution method; T treatment method. 	IHM <p>This ShipRight descriptive note (Inventory of Hazardous Materials) will be assigned when the requirements in accordance with the relevant ShipRight procedures have been complied with.</p>
DIST()	<p>This ShipRight descriptive note (Machinery suitable for operation on Distillate Fuels) will be assigned when specified machinery items are suitable for operation on distillate fuels, in accordance with the relevant ShipRight procedures. The DIST() descriptive note with the extension of one or more of the following associated supplementary characters shown in brackets, detailing the specified machinery items, may be assigned:</p> <ul style="list-style-type: none"> M main engine(s); AB auxiliary engines and boiler; I incinerator; IG inert gas generator. 	PCWBT(date) PCWBT() <p>The ShipRight descriptive note (Protection Coatings in Water Ballast Tanks) will be assigned, to indicate that all sea-water ballast spaces having boundaries formed by the hull envelope have a corrosion protection coating applied, and that the coating remains efficient and is maintained in good condition. The month and year that the coating is approved is to be appended to the descriptive note within brackets.</p>
		SEA(HSS-n) <p>Ship Event Analysis (Hull Surveillance Systems) for monitoring of the ship's hull girder stresses and motions.</p>
		SEA() <p>This descriptive note (Ship Event Analysis) will be assigned, where hull surveillance systems for monitoring of the ship's hull girder stresses and motions have been fitted and are in compliance with the relevant ShipRight procedures. The ShipRight descriptive note is to be appended by HSS followed by the number of strain gauges fitted shown in brackets. In addition the extension of one or more of the following associated supplementary characters may be shown e.g. ShipRight(SEA(HSS-2, VDR)):</p> <ul style="list-style-type: none"> L The display of the relevant information in the cargo control area; M The display and recording of the ship's motion;

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<p>N The facility to display and record navigational information;</p> <p>VDR An interface with the ship's voyage data recorder system to enable the recording of hull stress, ship motion and hull pressure information.</p>	<p>maintenance routines accordingly. For the design and installation of machinery condition monitoring systems which form part of a machinery planned maintenance scheme approved by LR for the assignment of the descriptive note, the requirements of Pt 5, Ch 21 are applicable.</p>
<p>SEA(ICE) Ship Event Analysis for monitoring of the ship's hull girder stresses and local ice loads when the ship is navigating in ice.</p>	<p>MPMS</p>
<p>SEA ICE This ShipRight descriptive note (Ship Event Analysis Ice) will be assigned when the ship has been provided with a hull surveillance system that can display and record local ice load induced stresses from a series of strain gauges in the bow region.</p>	<p>Machinery Planned Maintenance Scheme This ShipRight descriptive note (Machinery Planned Maintenance Scheme) will be assigned where an Owner operates an approved Machinery Planned Maintenance Scheme as part of the Continuous Survey Machinery (CSM) cycle. The descriptive note will indicate that procedures and documentation are in place to control and record the inspection and maintenance routines of all machinery and equipment in the ship.</p>
<p>SERS This ShipRight descriptive note (Ship Emergency Response Service) will be assigned when a Ship is registered with LR's Ship Emergency Response Service.</p>	<p>MCBM</p>
<p>SCM Screwshaft Condition Monitoring This ShipRight descriptive note (Screwshaft Condition Monitoring) will be assigned where an Owner adopts the requirements for monitoring of the screw-shaft. The descriptive note will indicate that equipment and procedures are in place to determine the physical and operational condition of that equipment.</p>	<p>This ShipRight descriptive note (Machinery Condition-Based Maintenance) will be assigned where an Owner operates an approved Planned Maintenance Scheme based on the use of Condition-based Maintenance as part of the Continuous Survey Machinery (CSM) cycle. The descriptive note will indicate that procedures and documentation are in place to control and record the inspection and maintenance routines of all surveyable machinery and equipment. The Scheme is to be based on acceptable and applicable modes of failure analysis and risk assessment approved by LR. For the design and installation of machinery condition monitoring systems which form part of a Machinery Condition-based Maintenance scheme approved by LR for the assignment of the descriptive note, the requirements of Pt 5, Ch 21 are applicable.</p>
<p>SRtP This ShipRight descriptive note (Safe Return to Port and Orderly Evacuation). To is to be applied where the design appraisal and survey of the vessel has been performed in accordance with the relevant ShipRight Procedure procedures where for vessels are required to comply with Safe Return to Port and Orderly Evacuation.</p>	<p>RCM</p>
<p>TCM Main Steam Turbine Condition Monitoring This ShipRight descriptive note (Main Steam Turbine Condition Monitoring) will be assigned where an Owner adopts the requirements for monitoring of the main steam turbine. The descriptive note will indicate that equipment and procedures are in place to determine the physical and operational condition of that equipment.</p>	<p>Reliability Centred Maintenance This ShipRight descriptive note (Reliability Centred Maintenance) will be assigned where an Owner operates an approved Planned Maintenance Scheme based on the use of Reliability Centred Maintenance as part of the Continuous Survey Machinery (CSM) cycle. The descriptive note will indicate that procedures and documentation are in place to control and record the inspection and maintenance routines of all machinery and equipment in the ship, and that they are based on acceptable and applicable methodology.</p>
<p>MCM Machinery Condition Monitoring This ShipRight descriptive note (Machinery Condition Monitoring) will be assigned where an Owner operates an approved Planned Maintenance Scheme as part of the Continuous Survey Machinery (CSM) cycle, and monitoring techniques and equipment are used to record the condition against agreed acceptable limits. The descriptive note will indicate that equipment, procedures and documentation are in place to monitor, control and record the physical and operational condition of the equipment on the ship and control the</p>	<p>BWMP</p>
	<p>Ballast Water Management Plan</p>

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DIST(M,AB,IG) Machinery suitable for operation on distillate fuels

M — main engine(s)

AB — auxiliary engines and boiler

I — incinerator

IG — inert gas generator

This notation will be assigned where the specified machinery items are suitable for operation on distillate fuel.

For example, the note **DIST(AB,IG)** will indicate that the auxiliary engines, auxiliary boiler and IG system are suitable for operation on distillate fuel.

IHM

Inventory of Hazardous Materials

VECS

Vapour Emission Control System

This notation ShipRight descriptive note (Vapour Emission Control System) will be assigned to a ship that has a vapour emission control system fitted which has been designed and constructed in accordance with the requirements of USCG 46, CFR 39 or the IMO Standards for Vapour Emission Control Systems (MSC Circular 585).

VECS-L

Vapour Emission Control System – Lightering

This notation ShipRight descriptive note (Vapour Emission Control System – Lightering) will be assigned to a ship that has a vapour emission control system that complies with the requirements for the **VECS** Descriptive Note and which has also been designed and constructed to meet the requirements for vapour balancing in accordance with USCG 46, CFR 39.40 for service vessels. If a ship has been assigned the **ECO** notation then it will not be eligible for the **VECS-L** Descriptive Note. Instead, **VECS** for lightering will be referenced in the **ECO** notation, i.e., **ECO(VECS-L)**.

Existing paragraphs 2.8.4 to 2.8.7 have been renumbered 2.8.3 to 2.8.6.

2.8.7 **GR**. Assigned to ships other than LNG carriers, detailing the aspects of design and construction that are prepared for gas fuel operation in accordance with LR's Rules and Regulations in force on the date of 'contract for construction'. If a ship has been assigned the **GF** notation then it will not be eligible for the **GR** descriptive note. The descriptive note **GR**, with the extension of one or more of the following associated characters shown in brackets, may be entered in column 6 of the *Register Book*.

- A** The design of the gas fuel system has been approved in principle.
- S** Enhanced structural reinforcement and appropriate materials have been fitted to support the proposed gas storage tank.
- T** Fuel storage arrangements installed in accordance with an approved design.
- P** Gas fuel piping arrangements installed in accordance with an approved design.

E Engineering systems have been installed in accordance with an approved design. Additional letters will be assigned in brackets to identify which items may be gas-fuelled:

M main engine(s);

A auxiliary engines;

B boiler;

I incinerator.

See LR's *Rules and Regulations for the Classification of Natural Gas Fuelled Ships*, Section 1.2 for further detail.

Part 3, Chapters 14 & 16

Part 3, Chapter 14 Cargo Securing Arrangements

Effective Date 1 December 2014

■ Section 1 General

1.2 Classification notations and descriptive notes

1.2.6 A ship designed to carry containers that is provided with safe access and securing arrangements in accordance with the Provisional Rules and Regulations for Ergonomic Container Lashing will be eligible to be assigned the special features notation **ECL** (Ergonomic Container Lashing), with supplementary descriptor.

Part 3, Chapter 16

ShipRight Procedures for the Design, Construction and Lifetime Care of Ships

Effective Date 1 December 2014

■ Section 1 General

1.1 Application

1.1.1 Where one or more of Lloyd's Register's (hereinafter referred to as 'LR') ShipRight procedures have been satisfactorily applied whether on a mandatory or voluntary basis, the associated ShipRight notation or descriptive note as detailed in Pt 1, Ch 2,2.3.17 or Pt 1, Ch 2,2.8.2 will be assigned.

1.1.2 In addition to the ShipRight procedures indicated in this Chapter, details of all LR ShipRight procedures are given in the *ShipRight Procedures Overview document*. Details of machinery ShipRight procedures can also be found in Pt 5, Ch 21.

1.1.1 This Chapter is applicable to all ship types and components with the exception of Sections 2 and 3 which are not applicable to Bulk Carriers or Double Hull Oil Tankers with a **CSR** notation, see Pt 1, Ch 2,2.8. The requirements are to be applied in conjunction with the relevant Chapters of Parts 3 and 4 applicable to the particular ship type, and the ShipRight procedures.

1.1.2 Details of Lloyd's Register's (hereinafter referred to as 'LR') ShipRight procedures are given in the *ShipRight Procedures Manual* and in this Chapter where related to particular items and notations.

1.1.3 Details of machinery ShipRight procedures are to be found in Pt 5, Ch 21.

1.2 Classification notations and descriptive notes

1.2.1 In addition to the hull class notations defined in Pt 1, Ch 2, ships complying with the requirements of this Chapter will be eligible to be assigned the additional class notations defined in Pt 1, Ch 2,2.1 and Ch 2,2.3 or descriptive notes as defined in Pt 1, Ch 2,2.7 and associated with the ShipRight procedures.

1.3 Information and plans required to be submitted

1.3.1 The information and plans required to be submitted are as specified in the relevant Chapters of Parts 3 and 4 applicable to the particular ship type and in this Chapter where related to particular items and notations.

■ Section 2 Construction monitoring

2.1 Construction Monitoring notation – CM

2.1.1 Extended controls on structural alignment, fit up and workmanship standards are to be applied in accordance with the *ShipRight Construction Monitoring Procedure*, to areas of the ship structure that have been requested or have been shown by other ShipRight procedures to be in need of particular attention. The ShipRight Construction Monitoring Procedure is mandatory when one or more of the procedures indicated in Sections 3, 4, or 5 have been applied, whether voluntarily or on a mandatory basis. Where the relevant procedures have been applied, the ShipRight notation **CM** is to be assigned, see also Pt 1, Ch 2,2.3.17.

■ **Section 2 Section 3**

Structural design assessment

2.1 3.1 Structural Design Assessment notation – SDA

2.1.1 The ship structure is to be examined using finite plate element methods to assess both the overall and detailed structural capability to withstand static and dynamic loadings. See:

- the applicable *ShipRight SDA Procedures Manual* for the procedure for each ship type; and
- the Section dealing with direct calculations in the relevant Chapter of Part 4 applicable to the particular ship type.

2.1.2 This procedure is mandatory, and additional to normal Rule structural design approval, for:

- (a) bulk carriers and oil tankers without a **CSR** notation (see 1.1.1) greater than 190 m in length;
- (b) container ships with a beam greater than 32 m;
- (c) The primary structure of LNG ships;
- (d) The primary structure of Type A LPG ships;
- (e) Other ships of Type B and C where the type, size and structural configuration demand;
- (f) passenger ships where it is considered that the superstructure will be subjected to a significant load from flexure of the hull girder; or, where it is required to utilise the load carrying capability of the superstructure for longitudinal strength; and
- (g) other ships where type, size and structural configuration demand, see also Pt 1, Ch 2,2.3 and Ch 2,2.7.

2.1.3 In addition, and where applicable, the ship structure is to be examined for the structural capability to withstand dynamic loadings from partially filled tanks or the influence of thermal loadings.

3.1.1 Where specified in the Rules the ship structure is to be assessed using finite element modelling in accordance with the applicable ShipRight SDA procedures. Where the relevant procedures have been applied whether on a voluntary or mandatory basis the ShipRight notation **SDA** will be assigned, see also Pt 1, Ch 2,2.3.17. In general the mandatory application criteria for implementation of one of the associated ShipRight SDA procedures is as follows:

- (a) bulk carriers and oil tankers without a **CSR** notation greater than 190 m in length;
- (b) ore carriers equal to and greater than 150 m in length;
- (c) container ships with a beam greater than 32 m;
- (d) the primary structure of LNG ships fitted by membrane cargo tanks;
- (e) the primary structure of LNG ships fitted with independent Type B spherical cargo tanks;
- (f) the primary structure of LPG ships fitted with Independent Type A cargo tanks;
- (g) passenger ships where it is required to utilise the load carrying capability of the superstructure for longitudinal strength; or where it is considered that the superstructure will be subjected to a significant load from flexure of the hull girder; or, where a limited number of transverse bulkheads above the bulkhead deck are present to carry the racking response;
- (h) other ships of abnormal hull form or where the type, size and structural configuration demand; and

- (j) upon application of any of the following ShipRight notations: **FDA**, **FDA plus()**, **FDA ICE**, **FDA SPR** and **WDA**, see also Sections 4 and 5.

In addition to the above, and where applicable, the structural capability to withstand dynamic loadings from partially filled tanks or the influence of thermal loadings may also be required to be assessed.

■ **Section 3 Section 4**

Fatigue design assessment

3.1 4.1 Fatigue Design Assessment notations – FDA, FDA plus, and FDA ICE and FDA SPR

3.1.1 The ShipRight FDA procedures for assignment of the notations **ShipRight FDA** or **ShipRight FDA plus** are to be applied in conjunction with controls in construction tolerances, in addition to the normal Rule structural detail design appraisal.

3.1.2 At the Owner's request and in order to enhance safety, the **ShipRight FDA ICE Fatigue Induced by Ice Loading Procedure** may be applied. This procedure is supplementary to the **FDA** procedures and is to assess fatigue damage induced by ice loads for ships navigating in ice-covered regions. The objective of **ShipRight FDA ICE** procedure is to provide technical guidelines to assess fatigue at the end connections of ice belt regions under ice loading. See Pt 1, Ch 2,2.3.17.

4.1.1 Where specified in the Rules the fatigue performance of the hull structure is to be assessed in accordance with the applicable ShipRight FDA procedures. Where an appraisal has been made whether on a voluntary or mandatory basis of the fatigue performance of the hull structure in accordance with the relevant procedures and found to comply with the requirement of 20 years fatigue life based on the 100A1 Fatigue Wave Environment (World-wide) trading pattern the ShipRight notation **FDA** will be assigned, see also Pt 1, Ch 2,2.3.17. In general the ShipRight FDA procedure is mandatory for all bulk carriers and oil tankers without a **CSR** notation and of length greater than 190 m or where the type, size and structural configuration demand. The ShipRight notation **FDA** is not applicable to ships approved using the IACS Common Structural Rules.

4.1.2 Where an appraisal is requested for a higher level of fatigue performance of the hull structure than that made for the assignment of the ShipRight notation **FDA**, the relevant procedures for the application of the ShipRight notation **FDA plus()** are to be applied. The appraisal may be made based upon a specific trading pattern, which is to be expressed in terms of either a Worldwide trading route, as defined in the relevant ShipRight procedures, or a North Atlantic trading route (that utilises the wave data from IACS Recommendation 34). The ShipRight notation **FDA plus()** is to be followed by the number of years that the vessel has been assessed for the specific trading pattern shown in brackets, for either the Worldwide or North Atlantic trading routes, denoted by **WW** and **NA** respectively, e.g. **FDA plus(25, NA)**. This procedure is applicable to all ships including those built in accordance with the IACS Common Structural rules.

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4.1.3 Where an appraisal is requested for the fatigue performance of the hull structure when navigating through ice, the relevant ShipRight FDA ICE procedures are to be applied. Where the relevant procedures have been applied the ShipRight notation **FDA ICE** will be assigned, see also Pt 1, Ch 2,2.3.17.

4.1.4 Where specified in the Rules an appraisal is to be made of the fatigue performance of the hull structure taking into account of the effects due to the continuous vibrational response of the hull girder in waves (springing) in accordance with the relevant ShipRight procedures. Where the relevant procedures have been applied the ShipRight notation **FDA SPR** will be assigned, see also Pt 1, Ch 2,2.3.17.

■ Section 4 Construction monitoring

4.1 Construction Monitoring notation – CM

4.1.1 Extended controls on structural alignment, fit up and workmanship standards will be applied to areas, shown by the structural design assessment and fatigue design assessment procedures specified in Sections 2 and 3, to be in need of particular attention. This procedure is mandatory for all ship types where either the SDA and/or FDA procedures have been applied on a mandatory basis. The procedure may also be applied on a voluntary basis in conjunction with the voluntary application of SDA and FDA procedures to ensure that the ship is designed and constructed to an enhanced structural standard. The requirements of Chapter 10, and the relevant procedures contained in the *Construction Monitoring Procedure* are to be complied with, see also Pt 1, Ch 2,2.3 and Ch 2,2.7.

4.1.2 The procedure is mandatory for all Bulk Carriers or Double Hull Oil Tankers greater than 190 m in length with a **CSR** notation, see Pt 1, Ch 2,2.3.

■ Section 5 Whipping design assessment

5.1 Whipping Design Assessment notations – WDA

5.1.1 Where specified in the Rules an appraisal is to be made of the vibrational response of the hull structure due to wave impact loads (Whipping) in accordance with the relevant ShipRight procedures. Where the relevant procedures have been applied the ShipRight notation **WDA** will be assigned, see also Pt 1, Ch 2,2.3.17.

Existing Sections 5 to 11 have been renumbered 6 to 12.

Part 4, Chapter 8 Container Ships

Effective Date 1 December 2014

■ Section 1 General

1.1 Application and definitions

1.1.3 Other terms used to describe the various structural components of container ships are generally indicated in Lloyd's Register's (hereinafter referred to as 'LR') LP's ShipRight FDA Procedure, *Structural Detail Design Guide*.

1.1.4 For container ships with a beam greater than 32 m, or where the structural arrangements are considered such as to necessitate it, the ShipRight notations **SDA** and **CM** are mandatory, see 1.3 and Section 14.

1.1.5 Scantlings of the primary structure of double bottom, side and transverse bulkheads are to be verified by direct calculation as required by 14.2.

1.1.6 1.1.4 Scantlings and arrangements of container ships are to be as required by Chapter 1, except as otherwise indicated in this Chapter.

1.2 Structural configuration

1.2.1 This Chapter describes a basic structural configuration as shown in Fig. 8.1.1 which includes:

- (a) An efficient torsion box girder or equivalent structure at the topsides comprising strength deck, side shell, inner skin and a second deck. The space within the torsion box is often utilised as an underdeck access passageway.
- (b) Single or double skin side construction with or without bilge box.
- (c) Double bottom.
- (d) Continuous or discontinuous hatch coamings.
- (e) Optional continuous dock girders to support hatch covers.

1.2.1 Figure 8.1.1 shows the typical structural configuration of a container ship covered by the requirements of this Chapter. The typical configuration includes:

- (a) An efficient torsion box girder or equivalent structure at the topsides comprising strength deck, side shell, inner skin and a second deck. The space within the torsion box is often utilised as an underdeck access passageway.
- (b) Single or double skin side construction with or without bilge box.
- (c) Double bottom.
- (d) Continuous or discontinuous hatch coamings.
- (e) Optional continuous deck girders to support hatch covers.

1.2.2 For container ships which do not conform to the above configuration, the application of this Chapter will be specially considered.

1.3 Class notations

1.3.2 The LR's 'ShipRight Procedures' for the hull construction of ships are detailed in Pt 3, Ch 16 and the associated classification notations and descriptive notes associated with these procedures are given in Pt 1, Ch 2,2.

1.3.3 The notations **SDA** and **CM** are mandatory for container ships with any of the following features:

- (a) beam greater than 32 m;
- (b) narrow side structures;
- (c) abnormal hull form; or
- (d) unusual structural configuration or complexity.

1.3.3 The ShipRight notation **SDA** (Structural Design Assessment) and subsequently **CM** (Construction Monitoring) are mandatory for container ships with a beam greater than 32 m or where the type, size and structural configuration demand, including container ships with narrow side structures, abnormal hull form or unusual structural configuration or complexity.

1.3.4 For large container ships, the effects of whipping and springing on the structural integrity are to be addressed. The ShipRight notations **WDA** (Whipping Design Assessment) and **FDA SPR** (Springing Fatigue Assessment) are mandatory for ships that meet the application criteria specified in 14.3, see also Table 8.14.1.

1.3.5 The ShipRight notations **SDA**, **FDA**, **FDA SPR**, **WDA** may be applied on a voluntary basis. In which case all the requirements of the relevant procedures and supporting procedures are to be applied.

1.3.4 When required, other cargoes or particular loading arrangements will be included in the class or cargo notations.

1.3.5 Reference is made to Pt 1, Ch 2 with respect to the Regulations for classification and assignment of class notations.

■ Section 3 Longitudinal strength

3.1 General

3.1.3 For ships of abnormal hull form, or for ships of unusual structural configuration or complexity, the values and distributions of wave induced loads are to be agreed with LR. LR may decide to mandate the application of the ShipRight notations; **SDA**, **FDA**, **FDA SPR** or **WDA**.

■ Section 13 Container stowage systems

13.3 Ergonomic container lashing

13.3.1 A ship designed to carry containers that is provided with safe access and securing arrangements in accordance with the *Provisional Rules and Regulations for Ergonomic Container Lashing* will be eligible to be assigned the special features notation **ECL** (Ergonomic Container Lashing), with supplementary descriptor.

CORRIGENDA

■ Section 14 Direct calculation

14.1 Procedures for calculation of combined longitudinal and torsional strength

14.1.1 For container ships as defined in 1.3.3(b), (c) and (d) or with beam greater than 33 m, with a beam greater than 33 m or where the type, size and structural configuration demand, including container ships with narrow side structures, abnormal hull form or unusual structural configuration or complexity, longitudinal strength calculations are to be made in accordance with Parts A and B of LR's ShipRight SDA Procedure for container ships, see also Table 8.14.1.

Effective Date 1 December 2014

■ Section 14 Direct calculation

14.3 Procedures for verification of structural response due to whipping, springing and fatigue

(Part only shown)

14.3.1 The ultimate strength of the hull girder of container ships is to be assessed against the extreme wave bending moments including whipping and wave impact loads in accordance with LR's ShipRight Procedure Guidance Notes on the Assessment of Global Design Loads of Large Container Ships and Other Ships Prone to Whipping and Springing where one or more of the following conditions applies. The ShipRight notation **WDA** is mandatory for container ships when one or

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more of the following conditions applies, and where the ultimate strength of the hull girder is assessed against the extreme wave bending moments including whipping and wave impact loads in accordance with LR's ShipRight Procedure Guidance Notes on the Assessment of Global Design Loads of Large Container Ships and Other Ships Prone to Whipping and Springing:

(Part only shown)

14.3.2 The fatigue assessment of container ships including hull girder springing is to be assessed where one or more of the following conditions applies, see Table 8.14.1: The ShipRight notation **FDA SPR** is mandatory for container ships when one or more of the following conditions applies, and where the fatigue performance of the hull girder taking into account the effects from springing, is assessed in accordance with LR's ShipRight Procedure Guidance Notes on the Assessment of Global Design Loads of Large Container Ships and Other Ships Prone to Whipping and Springing:

Table 8.14.1 Summary of direct calculation analysis requirements for container ships

Rule requirement See Note 1	Rule reference	ShipRight notation	Application criteria. If any of the following criteria apply then the appropriate analysis is required					
			Length criteria	Any of $ f_{S1} > 1,4$ or $RA_{BF} > 0,2$ or $RA_{BFU} > 0,2$	$f_c > f_{sp}$	Deck or hatch side coaming steel grade $\geq HT47$	Bottom steel grade $\geq HT36$	Breadth criteria
Part C of LR's ShipRight SDA Procedure for container ships	1.1.5	SDA	—	—	—	—	—	$B > 32$
Parts A and B of LR's ShipRight SDA Procedure for container ships	14.1.1	SDA	—	—	—	—	—	$B > 33$
Non-linear ship motion analysis to calculate hogging and sagging factors	3.2.3	—	—	$L > 300$	—	—	—	—
Non-linear ship motion analysis to calculate combined vertical, horizontal and torsional loads	14.1.2	—	$L > 350$	—	—	—	—	$B > 60$
Fatigue assessment	14.3.2	FDA (see Note 3)	$L > 350$	—	$L > 250$	Yes	Yes	—
Whipping assessment	14.3.1	— WDA	$L > 350$	$L > 300$	—	Yes	Yes	—
Springing assessment See Note 2	14.3.2	— FDA SPR	$L > 350$	—	$L > 250$	Yes	Yes	—

NOTES

1 The stated rule requirements may be deemed applicable to ships that do not meet the application criteria but where the structural configuration is such as to necessitate them.

2 The results of the springing assessment may also need a fatigue assessment procedure to be undertaken.

3 If ShipRight notation **FDA** is to be assigned, the requirements of LR's ShipRight FDA procedure are to be complied with; this may require calculations additional to those implied by 14.3.2.

Section numbering in brackets reflects any Section renumbering necessitated by any of the Notices that update the current version of the Rules for Ships.

Part 1, Chapter 2

2.1.8 Reference to paragraph 2.8.3 now reads 2.8.2

Part 3, Chapter 16

10.1.1 now 11.1.1 Reference to paragraph 10.1.2 now reads 11.1.2

Part 4, Chapter 8

Table 8.14.1 Reference to paragraph 1.1.5 now reads 14.2.1

Part 8, Chapter 1

1.1.3 Reference to Part 3, Chapter 16,5 now reads Part 3, Chapter 16,6

1.1.4 Reference to Part 3, Chapter 16,3 now reads Part 3, Chapter 16,4

Update to the current version of the Provisional Rules for the Application of Sandwich Panel Construction to Ship Structure:

Chapter 4

4.1.2 Reference to Part 3, Chapter 16,2 now reads Part 3, Chapter 16,3

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